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The Impact of Mexico's Retraining Program on Employment and Wages

Ana Revenga
Michelle Riboud
and
Hong Tan

Compared with the controls (without training), trainees (especially men) find jobs more quickly *if* they have work experience. Training increases men's monthly earnings to a greater extent the higher their level of schooling attainment.

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This paper — a joint product of the Latin America and the Caribbean Country Department II and the Industry Development Division, Industry and Energy Department — is part of a broader study of Mexico's labor market being carried out by the Human Resources Operations Division of the Latin America and the Caribbean Country Department II. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Debbie Young, room R2-050, extension 30932 (November 1992, 40 pages).

Revenga, Riboud, and Tan evaluated how Mexico's Labor Retraining Program (PROBECAT) affected unemployed and displaced workers. As part of the World Bank-supported Manpower Training Project (loan 2876-ME, 1987), PROBECAT has provided short-term vocational training to more than 250,000 unemployed people. Their evaluation was based on new longitudinal data on PROBECAT trainees developed for this purpose, and includes data on a control group of unemployed people who did not join PROBECAT. Their main findings were as follows:

- On average, the trainees found jobs more quickly than the control group. But training does not shorten the term of unemployment for those without work experience.

- Male trainees are more likely to be employed three and six months after training than are the controls. Female trainees with work experience are more likely to be employed three, six, and twelve months after training than are the controls.

- Male trainees are more likely to find employment in large firms than are comparable controls.

- Training increases the monthly earnings of male trainees, but this effect varies systematically depending on the person's level of schooling attainment.

- The monetary benefits of training outweigh the costs of the PROBECAT program for certain groups of trainees. For male trainees over 25 with prior work experience, the benefits outweigh the costs of training within *three months* of starting work. For all other males except those with no prior work experience, the benefits outweigh the costs within *one year*.

Men with no prior work experience spend the longest time job hunting after training (8 months, compared with the trainee mean of 4.4 months) and benefit less from training in terms of monthly earnings (128 thousand pesos compared with the average benefit of 152 thousand pesos). For this group, the costs of training are offset only after 17 months of higher earnings.

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SUMMARY

In the mid-1980s, Mexico entered a period of economic crisis when rising world interest rates, falling oil prices and a refusal by external creditors to roll over Mexico's short-term debt put an end to expansionary policies. Against this background, the Government of Mexico established a retraining program in 1984 for unemployed and displaced workers (Programa de Becas de Capacitacion para Trabajadores, or PROBECAT). Its objective was to dampen the social costs of major economic restructuring and rising unemployment during this period of macroeconomic turmoil. In 1987, the PROBECAT program was incorporated into the Bank-supported Manpower Training Project, and its scope and coverage expanded. Since that time, PROBECAT has provided short-term vocational training to over 250,000 unemployed people--approximately 50,000 trainees per year.

Although originally viewed as a transitional measure, the PROBECAT program is currently being considered for continuation over a longer period of time. Several reasons exist for this. The most important is concern about the impact of the proposed North America Free Trade Agreement (NAFTA) on migration flows, especially from rural areas, and on unemployment. Second, while the adjustment process to date has taken place with relatively little impact on observed unemployment rates, sizeable labor reallocations between expanding and contracting sectors still remain with further liberalization and privatization of the Mexican economy. The third reason is that the PROBECAT program is the only unemployment scheme currently in place in Mexico. In making decisions about the future of the PROBECAT program, policymakers will need information about the impact of retraining on target populations and the cost-effectiveness of the program.

This report evaluated the impact of participation in the PROBECAT program on the post-training employment and incomes of trainees. We sought to address four questions: (i) what is the impact of training on post-training employment of trainees; (ii) does training increase the speed with which they move from unemployment to employment?; (iii) conditional on their finding employment, what effect does training have on monthly earnings, hours worked, and hourly wages of trainees?; and (iv) do the monetary benefits from program participation outweigh the costs of providing retraining?

In answering these four questions, we compared the post-training labor market experiences of trainees with those of a control group--a matched sample of unemployed individuals who were eligible for, but did not participate in, the PROBECAT program. Since individuals are not selected randomly to join the training program, the evaluation methodology must account for any systematic

differences in the attributes of trainees and the control group. Otherwise, group differences are likely to lead to biased estimates of program effects, because of sample selectivity, or because trainees are overrepresented in the data relative to their true weight in the unemployed population. Both kinds of methodological problems were addressed in our evaluation. Our evaluation also sought to estimate program effects for specific groups of trainees--by sex, age, schooling completed, prior work experience, and degree of attachment to the labor force--to provide policymakers with guidelines on specific groups of unemployed individuals who should be targeted for retraining.

The evaluation was conducted using retrospective data on post-training experiences of the 1990 cohort of PROBECAT trainees, collected by the STPS in February 1992. For a control group, we developed a matched sample of unemployed individuals from the 1990-91 quarterly urban labor force surveys (ENEU). The two datasets permitted an evaluation of the PROBECAT program that substantially improved upon previous evaluation efforts. The earlier studies were constrained by lack of an appropriate comparison group (outcomes were compared for training completers and those who dropped out of training), and by relatively crude wage data (wage information was bracketed, and reported in reference to the minimum wage). Both of these limitations have been largely overcome in our evaluation.

Our evaluation of the PROBECAT program yielded several main findings:

(a) Compared to the control group, trainees on average tend to find jobs more quickly. Participation in PROBECAT reduces the mean duration of intervening unemployment spell by 2.5 months for males, and by 1.9 months for females. However, these figures hide considerable variations across different groups of trainees. The strongest effects are for trainees over the age of 25 years: training reduces the duration of unemployment spell by 3.7 months for males and 3.7 months for females. Much smaller impacts are found for those age 25 and under. Training does not shorten unemployment duration for those without work experience. They have longer spells of unemployment than the controls.

(b) Male trainees are more likely to be employed three and six months after training than the controls. However, this effect does not persist: at twelve months, the probability of employment is the same for trainees and controls. Taken together with (a), the implication is that PROBECAT training shortens the time to first job, and thus increases the amount of time trainees spend in employment in the first year after training.

(c) Female trainees with work experience are more likely to be employed three, six, and twelve months after program completion as compared to the controls. However, those without prior work experience are less likely to be employed at comparable intervals after completing training. This finding suggests that many women without work experience are being drawn into the PROBECAT program who otherwise would have remained outside the labor force.

(d) Male trainees are more likely to find employment in large firms than comparable controls. Large firms are known to pay higher salaries, and provide more stable employment, more training and more promotion opportunities. For females, no similar effect is found.

(e) Training increases the monthly earnings of male trainees, but this effect varies systematically by level of schooling attainment. The largest effects (increases of 28 percent to 37 percent in monthly earnings following training) are found for males with 6 to 12 years of schooling. Some part of this earnings effect among males is due to increased weekly hours worked, possibly because they are more likely than the control group to find employment in large firms where monthly earnings and work hours are higher. For females, training does not appear to raise their monthly earnings. While there is some evidence of positive effects on hours worked, this does not translate into higher monthly earnings for them.

(f) The monetary benefits of training outweigh the costs of the PROBECAT program for certain groups of trainees. For some groups of male trainees (those with prior work experience and those over 25), the benefits of program participation outweigh the costs within 3 months of starting employment. For all other males except those with no prior work experience, the benefits outweigh the costs within one year. Males with no prior work experience, on the other hand, spend the longest time in job search after training (8 months as compared to the trainee mean of 4.4 months) and benefit relatively less from training in terms of monthly earnings (128 thousand pesos as compared to the average benefit of 152 thousand pesos). For this group, the costs of training are offset only after 17 months of higher earnings upon finding employment. For women, we find that program benefits from earlier employment offset the costs for those with prior work experience and for those over 25 years. Although we do not find significant wage effects, for these women the program pays for itself. For other women, the costs exceed the benefits.

I. INTRODUCTION

Between 1950 and 1974, Mexico enjoyed a prolonged period of high growth, low inflation, and moderate accumulation of external debt. However, this era of economic stability ended when greater Government involvement in the economy resulted in growing public expenditures unmatched by revenues, and inflation and external debt became increasingly important sources of public finance. The pace of Mexico's economic growth remained rapid until 1982, when rising world interest rates, falling oil prices and a refusal by external creditors to roll over Mexico's short-term debt put an end to expansionary policies. The country then entered a period of declining per capita income, soaring inflation and balance of payments difficulties. The Government responded with a program of both fiscal and monetary austerity and accelerated structural reforms, which transformed Mexico into one of the world's most open economies and restored real per capita income growth.

As a response to the economic crisis, in 1984 the Government of Mexico established a retraining program for unemployed and displaced workers (Programa de Becas de Capacitacion para Trabajadores, or PROBECAT). Its objective was to dampen the social costs of major economic restructuring and rising unemployment during this period of macroeconomic turmoil. As adjustment efforts accelerated, the need for policies aimed at supporting the unemployed and facilitating their reemployment became more pressing As a result, in 1987, the program was incorporated into the Bank-supported Manpower Training Project (Loan 2876-ME), and its scope and coverage expanded. Since then, the PROBECAT program has provided short-term vocational training to over 250,000 unemployed people, approximately 50,000 trainees per year.

Although PROBECAT was originally viewed as a transitional measure, the Mexican Government is currently considering an extension of the program. There are several reasons for this. The most important is concern about the impact of the North America Free Trade Agreement (NAFTA) on migration flows, especially from rural areas, and on unemployment. Second, while the adjustment process to date has taken place with relatively little impact on observed unemployment--even in the worst years of the adjustment process, unemployment rates did not increase above 6.1 percent--substantial labor reallocations between expanding and contracting sectors are likely to occur with further liberalization and privatization of the Mexican economy. The third reason is that the PROBECAT program is the only unemployment assistance scheme currently in place in Mexico. In making decisions about the future of the PROBECAT program, policymakers will need information about the impact of retraining on target populations and the cost-effectiveness of the program.

The purpose of this report is to provide an evaluation of the impact of program participation on the employment and incomes of trainees. We seek to address four questions: (i) what is the impact of training on the subsequent employment experiences of trainees?; (ii) does training increase the speed with which trainees move from unemployment to employment?; (iii) conditional upon employment, what effect does training have on monthly earnings, weekly hours worked, and hourly wages of trainees?; and (iv) do the monetary benefits from program participation outweigh the costs of providing retraining?

In answering these four questions, we pose the counterfactual question: how do post-training outcomes differ from what would have happened had participants not received training? The approach we adopt is to compare the post-training labor market experiences of trainees with those of a control group--a matched sample of unemployed individuals who were eligible for, but did not participate in, the PROBECAT program. Since selection of individuals into the program is not random, the evaluation methodology must take into account any systematic differences between participants and non-participants; otherwise, these differences between groups could lead to biased estimates of the program effects.

Our evaluation focuses not only on overall program effects, but also on the effects of the program on specific groups of trainees. We seek to determine whether, and how, training effects vary across groups of trainees with different demographic attributes, such as age, sex, level of schooling completed, prior work experience, or degree of attachment to the labor force. These results will be important for providing Mexican policymakers with useful guidelines on the specific groups of unemployed individuals who should be targeted for retraining.

Previous PROBECAT evaluations have been constrained by several data and methodological limitations.[1/] Specifically, they lacked (a) a comparison group: outcomes (employment and earnings) for training completers six months out were compared to outcomes three months out for the group that failed to complete the training program ("deserters"); and (b) detailed wage data: earnings information was bracketed, and was only reported in reference to the minimum wage. Both of these limitations have been largely overcome in our evaluation. First, we have access to detailed data on the post-training experiences of the 1990 trainee cohort from a retrospective survey conducted by the Secretariat of Labor and Social Welfare (STPS) in February 1992.

1/ Sam Carlson, Mexico Labor Retraining Program: Poverty Alleviation and Contribution to Growth, LATHR Report #6, August 1991.

Second, we have developed a control group for the trainees, using panel data on a random sample of individuals drawn from the 1990-91 quarterly urban labor force surveys (ENEU).

We begin the report by providing a broad overview of the characteristics of unemployment in Mexico and of the PROBECAT program. We also describe several surveys that have been fielded to monitor the progress of trainees. We use these surveys, and data from the Urban Labor Force Survey (ENEU) to compare trainees and unemployed individuals that did not participate in training. This is followed by discussion of the methodological issues that arise in manpower training evaluations, and our approach to resolving them in this study. The next two sections report our estimates of the effects of training on probabilities of employment, time-to-first job, monthly earnings, hours worked per week, and hourly wage. In the concluding section, we summarize the most important findings, present estimates of the cost-benefit ratios of training for various groups of participants, and discuss the implications of these findings for the PROBECAT program and, more broadly, for other manpower training evaluation studies.

II. UNEMPLOYMENT AND THE PROBECAT PROGRAM: BASIC FEATURES

We begin by summarizing the main characteristics of unemployment in Mexico. Next, we describe the salient features of the PROBECAT program: its organization, the kinds of vocational training provided, and the criteria used to select individuals into the training program. Finally, we describe the data on PROBECAT trainees and a matched sample of unemployed individuals which we use for the evaluation.

Background: Basic Characteristics of Unemployment in Mexico

According to official unemployment statistics, the open unemployment rate in Mexico is quite low. In 1991, it stood at 2.8 percent of the labor force, and even in the worst years of the adjustment crisis, it did not rise beyond 6.1 percent. These unemployment figures, however, have a number of shortcomings. First, they refer only to urban unemployment. Second, they are based on a fairly loose definition of employment, which counts an individual as employed if he/she works at least one hour per week. Third, and most important, they include only those individuals who are actively searching for a job. However, research on a number of countries suggests that the distinction between "unemployed" and "not in the labor force" based on intensity of

search is usually very weak.[2/] Our analyses of employment survey data for Mexico, confirm that, in practice, the distinction between these two categories is very fuzzy for certain groups of individuals, implying that the official definition of unemployment tends to underestimate the true number of people who are in fact jobless.[3/] In particular, we find a large fraction of men who appear to be idle--these individuals are out of work, able to work, not studying and not taking care of the household. If these idle male workers are counted among the unemployed, the aggregate unemployment rate increases from 2.8 percent to 5.5 percent in 1991.[4/]

Table 1 reports the distribution of unemployment by age and education categories. Using the standard definition of unemployment, we find that for men as much as 60 percent of total unemployment is accounted for by individuals below the age of 25. The comparable fraction for females is even higher, at about 77 percent. Young workers are thus a very large fraction of the unemployed. As regards education, 53 percent of total male unemployment and 62 percent of total female unemployment corresponds to individuals with 7 to 12 years of schooling. Individuals with completed secondary education (9 years of schooling) account for 20 percent of total male unemployment and about 19 percent of total female unemployment. Those with high school education (10-12 years of schooling) account for an additional 20 percent of male unemployment and a stunning 35 percent of female unemployment. These figures suggest that unemployment is concentrated among those with a certain level of education and not, as could be expected, among the least educated. However, this conclusion has to be modified when the alternative definition of unemployment is used. Taking into account those individuals who report being idle increases the fraction of males with less than secondary education in total unemployment.

2/ For a discussion of the importance of considering these "idle" workers as unemployed, see Kim B. Clark and Lawrence H. Summers, "Labor Market Dynamics and Unemployment: A Reconsideration", Brookings Papers on Economic Activity, 1979. Also Lawrence H. Summers, "Why is the Unemployment Rate so Very High near Full Employment", Brookings Papers on Economic Activity, 1986.

3/ See A. Revenga and M. Riboud, "Unemployment in Mexico: An Analysis of its Characteristics and Determinants", World Bank mimeo, 1992.

4/ We do not define a comparable group of idle female workers because family responsibilities tend to make their labor market behavior patterns much more complex, with frequent periods out of the labor force.

Program Features

The PROBECAT program is administered through the network of state employment offices. Since 1987, it has trained a total of 251,181 unemployed persons and provided 9268 courses. During the training period, program participants receive a stipend equal to the minimum wage. Upon completion of the course, the local state employment office helps trainees find a job.[5/]

The majority of program participants enroll in classroom training, primarily in short-term vocational courses offered through contracts with local private and public institutions. Training is provided in several occupational areas: carpentry, construction, electricity, food preparation, graphic arts and design, handicrafts, machinery, mechanics, refrigeration, services and administration, shoe repair, textiles and apparel, and welding. In principle, courses are organized to respond to the needs of the local labor market, and are designed to redress local shortages of workers with particular skills. These needs are determined through periodic studies of local labor market conditions. Courses vary in duration from one to six months, with the majority of courses lasting three months.

Not everyone is eligible to participate in the PROBECAT program. The selection procedure gives variable weights to different criteria, including the number of economic dependents, having attained certain levels of basic education, prior work experience, and having been unemployed for less than three months. The exact weighting scheme is quite complex and non-linear. Individuals with a total composite score exceeding a threshold level are eligible to join the program. In addition, participants must (in theory) be between the ages of 20 and 55, and be registered as a job-seeker at the local state employment office.[6/] This non-random selection of individuals poses potentially serious measurement problems for any evaluation of the PROBECAT program.

Data Sources

A number of surveys have been fielded to help monitor and evaluate the PROBECAT program. The first, comprising follow-up surveys of trainees 3 and 6

5/ The follow-up survey data suggest, however, that most trainees find jobs on their own and not through the state employment service.

6/ The original age bracket was amended to allow a small number of participants between the ages of 16 and 20. The follow-up surveys also show a few participants above age 55.

months after program completion, has been used in several reports written by the STPS.[7/] A second, more complete retrospective survey, was administered to the 1990 cohort of trainees in February 1992.[8/] It elicited a wealth of information on all jobs held since completion of training until February 1992, including the start and end dates for each job, monthly salary, hours worked per week, occupation and industrial sector. Our evaluation is based on the second PROBECAT survey.

As a control group for these trainees, we use a sample of unemployed individuals drawn from the 1990-91 quarterly urban labor force survey (ENEU). ENEU, a household-based survey of the sixteen main urban areas in Mexico, which elicits detailed information on employment status, jobs, monthly salary, and hours of work broadly comparable to the PROBECAT survey. ENEU uses a quarterly rotation system such that each rotation group (of households) remains in the survey for five consecutive quarters, and then leaves the sample. We obtained panel data for the rotation group that remained in the survey from the third quarter of 1990 to the third quarter of 1991--the same period spanned by the trainee data--and drew our control group from this sample. This control group includes all those who were unemployed in the third quarter of 1990 (who we then track for a year).[9/] For certain analyses, we will augment this control group with a second cohort who became unemployed in the fourth quarter of 1990 (and were not in the first cohort). For this latter cohort, only nine months of data are available.

Table 2 presents summary information on the demographic characteristics of our samples of trainees and controls. In 1990, the average PROBECAT male trainee was 28 years old, with the majority having completed primary schooling

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7/ See STPS, Reporte de Seguimiento del Programa de Becas de Capacitacion para Trabajadores 1988, Reporte de Seguimiento del Programa de Becas de Capacitacion para Trabajadores 1989, and Reporte de Seguimiento del Programa de Becas de Capacitacion para Trabajadores 1990 (preliminary). None of these reports include comparisons of post-program outcomes for trainees with those for a control group.

8/ The original 3 month follow-up survey had been administered to 1,995 trainees, but it was impossible to track down 273 of these. Some basic consistency checks provided a match for 1,722 individuals. Four individuals included in the new 1992 survey were not part of the original one.

9/ As discussed earlier, we use two alternative definitions of "unemployed". Under the "standard" definition of unemployed, we include all those individuals who report to be (a) out of work the previous week and (b) searching for a job. Under the "alternative" definition of unemployed for males, we also include those who report to be (a) out of work the previous week, (b) able to work, and (c) not students or retirees, whether they are searching for a job or not.

and some secondary education. About 41 percent were married. The average female trainee was 29 years old, with similar levels of education to males, and about 46% were married. Among those trainees who were unemployed at the time they entered the program, 74 percent reported having had previous work experience; the proportions are higher for males (85 percent) than for females (62 percent). Almost half of the men (45 percent) identified themselves as being household heads. It is evident from Table 2 that trainees differ from the general population of the unemployed. Compared to the controls, trainees tended to be slightly older, be married or the household head, have completed secondary school but not a higher education. Though not shown in Table 2, the trainee group also tended to include a higher proportion of women than the controls (51.4 percent versus 46.1 percent, respectively).

III. THE EVALUATION METHODOLOGY

In this evaluation, we are interested in estimating the impact of training on several outcome measures: (i) time taken to exit from unemployment (ie. time to first job); (ii) the probability of employment at three, six, and twelve months after the end of training; (iii) post-training monthly earnings; (iv) weekly hours of work; and (v) hourly wages. Analysis of such a wide variety of outcome measures departs from the traditional focus of most manpower training evaluations on the earnings impact of training, with relatively little attention paid to its impact on subsequent employment.[10/] We believe this approach provides a more complete characterization of program effects. For example, earnings comparisons are contingent upon having a job, and one impact of training may be to increase the likelihood of employment.[11/] Similarly, monthly earnings are the product of hours of work and hourly wage rates, and training may have very different effects on these two outcomes.

A number of methodological issues arise in evaluating the impact of the PROBECAT program. The first issue is that of selectivity bias. As Table 2 demonstrated, trainees are a non-random sample of the unemployed population. Failure to control for these differences in observed characteristics of trainees and controls can lead to biases in estimated program impacts. These

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10/ An exception is David Card and Daniel Sullivan, "Measuring the Effect of Subsidized Training Programs on Movements In and Out of Employment", Econometrica, Vol. 56, No. 3, May 1988, pp.497-530.

11/ Card and Sullivan (1988) provide evidence that a large part of the measured training effect on earnings results from increases in the post-training employment of trainees.

biases are potentially exacerbated by systematic differences across groups in unobserved (to the analyst) characteristics, such as motivation, ability, or tastes. A second, related issue arises because trainees are overrepresented in our data relative to their true weight in the population; they represent 74 percent of our data sample versus 10 percent in the total unemployed population in 1990. The oversampling of trainees, who have very different attributes from other unemployed individuals, gives rise to estimates of program effects that are not representative of the underlying unemployed population.

We address these methodological issues in several ways. Two approaches are used to control for selectivity bias. One uses PROBECAT's own selection criteria to define comparable samples of controls for the trainees. This involves first estimating a probit model relating the likelihood of program participation to the PROBECAT selection criteria for which we have data, such as marital status, number of children, dependents, schooling and time spent unemployed prior to entering PROBECAT, and then limiting the control sample to individuals with high predicted probability of program participation.[12/] This approach is adopted in the analysis of training effects on employment. A second approach, which we will use in the analyses of monthly salary, hours of work, and hourly wage, is based on the two-stage selectivity correction procedure developed by Heckman (1979).[13/] This involves estimating a model of selection into PROBECAT, calculating a variable to capture the individual's likelihood of program selection, and including this variable as a regressor in the outcome models.

The second issue arises when program effects are estimated without taking into account the overrepresentation of trainees in the data. The estimates are biased because these models give undue weight to the attributes of trainees that differ, often substantially, from those of the control group. This issue may be resolved by constructing choice-based weights to reflect the true relative proportions of both trainees and controls in the unemployed

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12/ A similar approach is followed in Westat, "Continuous Longitudinal Manpower Survey Net Impact Report No.1", Report prepared for the US DOL, 1981. Westat, "Summary of Net Impact Results", Report prepared for the US DOL, 1984. Laurie Bassi, "The Effect of CETA on the Postprogram Earnings of Participants", Journal of Human Resources, Vol. 18, No. 4, 1983, pp. 539-56. And Vincent Geraci, "Short-Term Indicators of Job Training Program Effects on Long-Term Participant Earnings", Report for U.S. DOL, 1984.

13/ James Heckman, "Sample Selection Bias as a Specification Error", Econometrica, Vol. 47, No. 1, 1979, pp. 154-61.

population age 15-54 years.[14/] The population parameters of interest may be recovered by using these choice-based weights to estimate weighted models of program outcomes.

IV. TRAINING EFFECTS ON EMPLOYMENT

We begin the evaluation by assessing the impact of program participation on the likelihood of employment, both in the short-term and over increasingly longer periods of time. First, we ask if participation in training has any effect on the time it takes for trainees to move from unemployment into a first job. Next, we ask whether trainees differ systematically from the control group in their probability of employment at three, six, and twelve months after time 0. For trainees, this is the time since completion of training; for the control group, this is the time since we first observe them unemployed in the third quarter of 1990. Together, the two sets of analyses can be used to draw inferences about the proportion of time both groups spend in employment over the first twelve months.

Time To First Job

What is the impact of PROBECAT on time-to-first-job? For the trainee sample, it is straightforward to construct a measure of time-to-first-job (expressed in months) using information on the end-dates for training and the start-dates for the first job. For trainees that have not found a job within the sample period, we compute the time elapsed from training completion to February 1992, and code this spell as censored. Constructing a time-to-first job measure was more difficult for the control group. We have information on time unemployed up until the third quarter of 1990. However, we only observe their subsequent employment status at discrete points in time over a one-year interval, and must therefore infer time-to-first-job by appealing to steady state assumptions, or from individual transitions from one labor market status to another.

We experimented with both approaches. First, we treat unemployment duration reported by the control group as being representative of the underlying distribution of incomplete unemployment spells. For each unemployed individual, we observe an incomplete unemployment spell. Under steady state

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14/See S. Lerman and C. Manski, "On the Use of Simulated Frequencies to Approximate Choice Probabilities", in C. Manski and D. McFadden (eds.), Structural Analysis of Discrete Data, MIT Press, Cambridge, 1981.

assumptions, we can infer a distribution of completed spells by simply doubling the duration of observed incomplete spells for each individual.[15/]

A second approach is to exploit the panel nature of the ENEU data. By tracking individuals over time, we can identify the first quarter in which they find a job or, if they remain unemployed at the end of one year, we code the unemployment spell as being censored. However, knowing that the first job was found (say) after one quarter does not allow us to compute time-to-first-job. We therefore assume that the first job was found at the end, the middle, or the beginning of the interval. These assumptions correspond to adding 3, 1.5, or 1 month(s) to the incomplete unemployment spell reported in the third quarter of 1990. Both approaches, and all three assumptions, yielded similar results, namely, that time-to-first-job is significantly shorter for trainees than the control group. The results reported below are based on the second approach using the most stringent start-time assumption.

We corrected for selectivity bias by applying to the control group the same criteria used to select trainees into the program. We first estimate an equation for the probability of selection into the PROBECAT program, relating program participation to the criteria for which we have information--marital status, number of children and economic dependents, schooling, and time spent in unemployment at the selection point. We then limit the sample of controls to "eligible" individuals who have a high predicted probability of program participation. All the employment results presented below are based on comparisons of the trainees with the selectivity-corrected sample of controls who were eligible for, but did not participate, in the PROBECAT program.

Figure 1 plots survival curves for male trainees and controls using the raw duration data on time-to-first-job. These survival curves are defined as a function of time t (in months). They indicate the probability of remaining unemployed t months after entering unemployment. We present separate survival curves for those age 25 and under, and for those over 25 years old. They clearly show that trainees exit unemployment more quickly than do the controls: at three months, 62 percent of young trainees have left unemployment as compared to just 42 percent of controls. The difference is more marked for the older trainees: 72 percent of them have left unemployment within 3 months, versus 33 percent of controls. We estimate that the average duration of unemployment for male trainees aged 25 and under is 1.4 months shorter than that for controls; for trainees over 25, average duration of unemployment is

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15/ See Stephen Salant, "Search Theory and Duration Data: A Theory of Sorts", Quarterly Journal of Economics, 1977.

3.7 months shorter than that for controls. We also computed comparable survival curves without the selection correction for the control sample. These yielded very similar results.

Figure 1 also shows survival curves for young males, age 25 and under, both with and without previous work experience. Young trainees with work experience exit unemployment more quickly than the controls. However, for new entrants into the labor force, the patterns are quite different, with some trainees exiting unemployment quite quickly, but others remaining unemployed for a long time. About 39 percent of young trainees without work experience remained unemployed twelve months after training completion. In contrast, all young members of the control group without work experience exited unemployment at twelve months. Not surprisingly, we find that the average duration of unemployment for this group of trainees exceeds that for comparable controls by 1.5 months.

With the exception of age categories, these graphical comparisons do not control for any systematic differences in the demographic characteristics of the trainee and control groups. These unadjusted comparisons may be misleading if unemployment duration is related to education level or other individual and household characteristics.[16/] To address this potential problem, we estimate a cox proportional hazards model of unemployment duration using pooled trainee and control samples. This model decomposes reemployment probabilities (the hazard rate) into a function of time (which is the same for all individuals) as well as other regressors. This regression approach allows us to investigate the impact of training on time-to-first-job, controlling for both individual and group differences in age, educational attainment, prior work experience, and various household attributes.

Table 3 presents the cox regression results for males. The estimated coefficient on the indicator variable for training is both positive and statistically significant in all cases, confirming the previous finding that PROBECAT trainees exit unemployment more quickly than do the controls. The size of this coefficient suggests that the average duration of unemployment for the control group is 30 percent longer than that for trainees.

Figure 2 plots survival curves for female trainees and controls by age group. Like their male counterparts, female PROBECAT trainees appear to exit unemployment more quickly than female controls. At three months, 50 percent

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16/ However, a parallel analysis of unemployment duration in Mexico suggests that only age and having economic dependents are likely to be of importance. See A. Revenga and M. Riboud (1992).

of female trainees aged 25 years and under have found employment, as compared to 32 percent of the control group. For the sample of young females, these differences disappear over the course of the first year: after nine months the survival curves for trainees and controls are virtually identical. For the sample of older women, the trainee-control difference increases over the year so that 75 percent of trainees have left unemployment after 12 months, as compared to 47 percent of controls.

We also compared employment effects for women with different degrees of attachment to the labor force. If training is enhanced by initial skill or schooling endowments, we might expect training effectiveness to be diminished for women with low attachment to the labor force because of skill obsolescence. To explore this hypothesis, we distinguish between (1) the women that worked sometime in the six months prior to training, and (2) those who were without work for a longer period of time. Figure 2 shows the survival curves for these two groups of women. In both cases, the trainees fared better than the controls. However, trainees who recently left employment exit unemployment after training more quickly than women who were reentering the workforce after a long inactive spell.

Table 4 presents the results of estimating a cox proportional hazards model of unemployment duration for the pooled sample of women. They suggest that differences in exit rates between trainees and controls disappear once account is taken of individual characteristics. The coefficient on the training indicator variable is invariably close to zero; however, this result is due in large part to the unemployment effects of labor force attachment shown in Figure 2. When an interaction term between training and duration of prior unemployment is included in the cox model, the results suggest that women who entered training after a relatively short spell of unemployment exit more quickly than controls; those who entered training after a long spell out of the labor force exit more slowly.

Employment Probabilities Over Time

We also compared employment probabilities of trainees and controls over progressively longer intervals of time. The ENEU reports the labor market status of the control group at three, six, nine, and twelve months after the third quarter of 1990 (when we first observe them). For PROBECAT trainees, we use start and end dates from their retrospective histories to define labor market status variables for comparable intervals of time after the completion of training.

Table 5 presents, separately by sex, simple comparisons of the percent of trainees and controls employed at three, six, nine and twelve months. The figures suggest that trainees are more likely to be employed during the year following training than are the controls. For men, the difference is about 9 percentage points at three and six months, and 5 percentage points at nine and twelve months. For women, the difference between trainees and controls is somewhat smaller, averaging 4 to 5 percentage points over the year.

These figures, however, are sensitive to the groups being compared. In Table 6, we differentiate between new labor force entrants and those with previous work experience. These figures suggest that training is much less effective for new entrants. Trainees with work experience are slightly more likely to be employed than the comparable control group at three months, but thereafter the difference between the two groups becomes negligible. In contrast, trainees without work experience are slightly less likely to be employed than the control group at three months, and they are significantly less likely to be employed at twelve months. A similar, but somewhat more pronounced, pattern is found for the female sample of trainees and controls.

This example highlights the importance, in manpower training program evaluations, of controlling for group differences in demographic characteristics. As we noted earlier in the previous section on methodology, simple comparisons can be very misleading if trainees differ systematically from the control group. In this case, the critical difference between groups appears to be a greater representation of new labor force entrants in the control group. Group differences, that may be induced in part by program selection, are explicitly taken into account in the following analyses.

We estimate probit models in which the probability of employment--at three, six, and twelve months--is related to age, schooling, prior work experience and unemployment duration, and an indicator variable for whether the individual participated in the PROBECAT program. The issue of selectivity bias is addressed using the same approach as in the analysis of time-to-first-job. We also estimate weighted models to account for the oversampling of trainees in our pooled data.

The effects of PROBECAT on the subsequent employment probabilities of men and women are summarized in Tables 7 and 8, respectively. The regression results on which these figures are based are available upon request. First, consider the results for men. The unweighted regression model without selectivity correction suggests that training produces a weak positive effect on the probability of employment at three months, and a zero effect thereaf-

ter. Selectivity correction strengthens these results: the corrected estimates show a statistically significant effect of training on the probability of employment at three months, and a smaller but still significant effect at six months. The weighted probits yield roughly similar results.

A slightly different pattern of training effects is found for women. The simple unweighted estimates without a selectivity correction show that training had no impact on probability of employment; the unweighted, but selectivity corrected estimates, show a positive training effect but only in specifications including dummy variables for different educational attainment. The weighted model estimates (both uncorrected and corrected) show a marginally significant positive effect at three months, and a larger and statistically significant impact on employment at six and twelve months.

A substantial proportion of the female trainee sample had no prior work experience.[17/] From the previous analysis, we know that these women are more likely to remain unemployed for longer than the control group. To account for this possibility, we modify the specification of the employment equations to include an interaction term between training and an indicator variable for prior work experience. These results, reported in Table 9, show that training has a significantly positive effect on employment at three, six and twelve months for women with prior work experience, but a negative and statistically significant training effect at three and twelve months for those without work experience.

To summarize, participation in the PROBECAT program appears to impact subsequent employment probabilities of trainees, but in quite different ways for men and women. For males, it increases their probability of being employed up to six months after the program, but does not have an effect thereafter. Taken together with the previous finding that they find jobs more quickly, this result suggests that male trainees tend to be employed for a greater proportion of the post-training period as compared to the control group. For women, training appears to raise employment probabilities for those with prior work experience. Unlike males, however, this positive training effect persists over the year. In contrast, women without any work experience benefit relatively little, if at all, from training.

17/ In contrast, the proportion of male trainees with no previous work experience is quite small. Because of this, we decided not to estimate separate training effects by previous work experience for males.

V. MONTHLY EARNINGS, HOURS OF WORK, AND HOURLY WAGE

We also investigate the impact of training on monthly earnings, weekly hours of work, and hourly wage. We report two sets of results: the first focusing on overall program effects, the second on program effects by level of educational attainment of trainees. To anticipate the results, we find very significant differences in the effects of training on monthly earnings and weekly hours worked across schooling groups.

Data and Summary Statistics

The dataset used for this analysis was constructed from the retrospective PROBECAT survey and two ENEU cohorts. The first cohort included individuals who were unemployed in the third quarter of 1990 (they are tracked for 12 months). The second cohort included individuals who became unemployed in the fourth quarter of 1990, and were not in the first cohort; for this latter cohort, only nine months of information are available. We pooled all observations reporting positive (and usable) salaries anytime over the period of the PROBECAT survey, and over the 12 (or 9) months interval in the case of the ENEU cohorts.[18/] The dataset thus contains multiple observations on each individual, for every job spell experienced by trainees, and for every quarter in which ENEU cohorts are observed to be employed. The final dataset contains 1,212 trainee-observations and 1,051 control-observations for men; for the women, the corresponding sample sizes are 681 and 300 observations, respectively.

To accommodate the specific structure of this dataset, we created two kinds of control variables. The first is a variable for the number of months between the date salaries are reported and time 0, which is either the completion of training or the initial date of unemployment for the ENEU cohorts. The second is a set of quarterly dummy variables to account for inflation in salaries over the base period (pre-1991).

Means of the three outcome variables for men and women are reported in Table 10, separately for trainee and control samples. On average, male trainees report monthly earnings of 682 thousand pesos as compared to 638 thousand pesos for the controls; in other words, earnings that are about 7 percent higher than those of the control group. However, higher earnings may partly reflect inflation since trainee salaries include those reported in the

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18/We define usable data as positive monthly earnings less than 5 million pesos, and hours worked less than 85 hours a week.

first quarter of 1992 while control group salaries end in the third quarter of 1991. Trainees also report slightly higher hours of work, 45.8 hours per week, as compared to 43.6 hours for the controls. Finally, the hourly wage of 3,984 pesos for trainees is slightly lower than the 4,016 pesos estimated for the control group.

In the female sample, trainees report monthly earnings that are about 7 percent lower than those of the control group: 532 thousand pesos versus 572 thousand pesos, respectively. Like their male trainee counterparts, those that worked did so for three hours a week longer than the controls. However, their hourly wage was almost 700 pesos per hour less than that received by the control group of women.

The Regression Results

We analyze the impacts of training on the logarithm of monthly earnings, weekly hours worked, and the logarithm of hourly wages. Each of these outcome measures is regressed on a vector of explanatory variables, including a quadratic measure of potential work experience, level of schooling attainment, prior work experience and unemployment duration at time 0, five quarterly dummy variables, and an indicator variable for whether the individual participated in PROBECAT. We also experiment with interaction terms between training and levels of educational attainment to see if training effects vary across different schooling groups (these are reported below).

As discussed above, several potential measurement problems arise when trainees are not randomly selected from the unemployed population. To correct for potential selectivity bias, we first estimate a probit model relating program participation to those selection criteria variables for which weave data, namely marital status, number of children, schooling, and time spent unemployed prior to training. Following Heckman (1979), we include the inverse Mills ratio as a regressor in the outcome equations. The second issue--overrepresentation of trainees in our data--is addressed by including choice-based weights in these models.

Overall Program Effects

Table 11 summarizes the overall impacts of program participation for men and women.[19/] The two columns in Table 11 correspond to different model specifications: (1) simple ordinary least squares regression, and (2) models

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19/ The full set of results are available upon request.

that correct for non-random selection into the PROBECAT program. The rows in this table correspond to results for models estimated without corrections for the oversampling of trainees and models which include choice-based weights. The reported coefficients in Panel A and Panel C may be interpreted as the average percentage change in monthly earnings and hourly wage attributable to participation in the PROBECAT program; coefficients in Panel B are the mean changes in weekly hours worked attributable to participation in training.

First, consider the monthly earnings of the male sample. Recall that male trainees reported monthly earnings that, on average, were 7 percent higher than those of the control group. However, the unweighted model specification (1) without selectivity correction indicates that the monthly earnings of male trainees are 12 percent lower than that of the controls, suggesting that the two groups have very different attributes. In model (2), which corrects for selectivity bias (and these group differences), this earnings differential is reversed. The unweighted estimates now show that the monthly earnings of trainees are 17.7 percent higher, a difference that is statistically significant; however, the weighted results only show a training effect that is marginally significant.

The results also suggest that training is associated with increased labor supply for the male sample. In the raw data, trainees reported working about two hours more a week as compared to the controls. The hours regression without selectivity correction (model 1) reveals no significant differences in hours worked between the two groups. However, model (2) shows that trainees supply, on average, between 7.8 (unweighted) and 8.4 (weighted) more hours per week than the controls. In the hourly wage results, selectivity correction reduces or even reverses the negative effect of PROBECAT on hourly wage. The weighted results with selectivity correction (model 2) revealed no differences in hourly wage between the two groups. Together, these results suggest that, on average, training raises monthly earnings of male trainees through greater supply of hours worked per week, not through higher hourly wages.

A similar pattern of training effects is found for the women. In the aggregate data, women trainees received lower monthly earnings and hourly wages, but worked more hours per week, than the control group. In model (1), these program effects on earnings, hourly wage, and hours worked are generally statistically significant. In model (2), however, many of these differences disappear. The only statistically significant effect of PROBECAT is in the unweighted results for hours of work; here, the results suggest that women trainees work approximately six extra hours of work per week as compared to the control group.

Training Effects by Schooling Group

Thus far, we have assumed implicitly that program effects are invariant across different groups of trainees. This may not be a good assumption if the effectiveness of training is shaped by the initial skill endowments which trainees bring to the PROBECAT program. If education helps trainees get more out of training, we would expect training effectiveness to increase (at least over some range) with level of schooling. We address this possibility by including interaction terms between the training variable and the indicator variables for each level of schooling attainment. As before, a separate set of dummy variables for each schooling group (except one) are included to control for pure schooling effects common to both groups of trainees and controls.

Table 12 presents the results of estimating these expanded model specifications for men. To conserve space, we only report regression parameters for two outcomes measures: the logarithm of monthly earnings and hours worked per week.[20/] Two sets of estimates are reported, one for models estimated with the selectivity correction, and one with both selectivity correction and choice-based weights. The corresponding results for women are largely unchanged, suggesting that the training effects in these specific outcomes are similar across schooling groups. The results for women are therefore not reported here.

For the male sample, Table 12 suggests that training has positive and statistically significant effects on monthly earnings and hours of work by level of schooling attainment. In general, these earnings and hours effects exhibit an inverted U-shape pattern: being lowest for the least educated males, rising with years of schooling to a peak at the secondary school level (7 to 9 years of schooling), and then declining for the most educated individuals (with post-secondary schooling). When corrected for sample selectivity, the results indicate that training reduces the monthly earnings for the least educated trainees (however, the parameters are not statistically significant). In the weighted models, the earnings effects of training are positive and usually larger, though they are statistically significant only for those with 7 to 9 years of schooling. The hours of work results change in a similar fashion for the two specifications; however, unlike the earnings results, the training effects tend to be positive and significant for most educational groups.

20/ The hourly wage results are unchanged in the expanded specification. In almost all cases, the training-schooling interaction terms are not different from zero.

These results--positive impacts on monthly earnings and hours worked but no systematic effect on hourly wage--raise questions about whether training actually increases productivity, in which case one might expect higher hourly wages, or whether it raises earnings by inducing greater work effort among trainees. We believe the answers lie in the kinds of jobs that trainees find after completing training. The raw data suggest that a higher proportion of trainees eventually find jobs in large enterprises as compared to the control group. For the sample as a whole, employment in large firms is associated with longer hours of work per week and higher monthly salaries, which may partially explain the results that we find. To explore this hypothesis more rigorously, we estimated an ordered logit model for the probability of employment in ten (increasingly larger) size categories of firms. As regressors, we included measures of experience, duration of previous unemployment, time dummy variables, and an indicator variable for participation in the PROBECAT program.

Table 13 reports the results for three different model specifications: training by itself, training interacted with a quadratic schooling measure, and training interacted with indicator variables for each schooling level. Compared to the control group, all three specifications suggest that trainees are more likely to find jobs in larger firms. The fully interacted specification reveals an inverted-U pattern of effects by schooling group, similar to the previous findings for earnings and hour of work. In short, the PROBECAT program appears to raise trainees' monthly earnings and work hours by facilitating their entry into larger firms offering higher pay and more stable, full-time employment. It may achieve this result either by retraining the unemployed in skills for which there is demand, i.e. a matching effect, or by making them more trainable, i.e. providing them with learning skills. PROBECAT may also indirectly impact their future earnings potential by placing them in large firms that tend to provide employees with more on-the-job training.[21/] Trainees will have to be followed over a longer time period for us to verify this hypothesis.

To summarize, the results suggest that participation in PROBECAT increases monthly earnings of male trainees, and that this occurs primarily through their increased hours of work. The disaggregated analyses by schooling reveals that this effect varies with schooling attainment. The effects of training on monthly earnings are largest for those with secondary education (7 to 9 years of schooling). The hours of work effects are large and positive

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21/ Estimates drawn from the 1988 National Employment Survey show that the proportion of workers receiving training in the workplace varies from 5% in micro enterprises to 23% in large firms (those with more than 250 employees).

for most groups, except possibly for those with the lowest and highest levels of education. For females, there is some evidence that work hours are increased by training, but these do not translate into higher monthly earnings. Unlike their male counterparts, the earnings and hours effects of training do not vary by level of schooling. The results also suggest that, for males, program participation increases the probability of finding employment in a large firm. Since large firms tend to pay higher wages, provide more training opportunities and thus have steeper earnings profiles, finding a job in a large firm is likely to imply increased earnings opportunities over time for trainees relative to controls.

VI. CONCLUSIONS AND IMPLICATIONS

Our evaluation of Mexico's PROBECAT program sought to measure the impact of training on a larger set of labor market outcomes than is traditionally investigated in manpower training evaluation studies. In these analyses, training outcomes were estimated by comparing PROBECAT trainees to a control group of unemployed individuals, and an effort was made to account both for non-random selection of individuals into the program and for the choice-based design of our datasets.

Summary of Findings

We arrived at the following general conclusions. First, trainees move out of unemployment more quickly than do members of the control group. However, training does not appear to reduce the duration of unemployment for trainees without prior work experience. Second, training improves the likelihood of employment for program participants over a longer period of time. Compared to the control group, male trainees are more likely to be employed three and six months after training; female trainees with prior work experience also benefit, but unlike male trainees, these positive employment effects appear to persist over a full year. Third, program participation for males, increases the likelihood of employment in large firms, which typically provide more training opportunities and higher wages. Fourth, program participation raises the post-training earnings of men but not women. For male trainees, these earnings effects vary systematically by level of schooling attainment, being greatest for those with 7 to 9 years of schooling. Finally, for both men and women, training induces an increase in the number of hours worked per week. For males, this hours of work effect translates into higher monthly salaries; for females, it does not.

Cost-Effectiveness of PROBECAT

What do these findings imply about the cost-effectiveness of the PROBECAT program? To answer this question we focus on two of the more significant outcomes identified in the previous analyses: first, the impact of program participation on the speed with which trainees find jobs; second, the impact of program participation on monthly earnings. These two impacts, and their implications for the benefit streams associated with program participation, are combined with cost estimates to arrive at some tentative conclusions about the cost-effectiveness of the PROBECAT program.

The costs and benefits of the program are discussed below. We include both the direct training costs as well as the indirect costs associated with participation in the program. Direct costs (costs for instructors, training materials, and program administration) are readily available from STPS: in 1991, the average operating cost per course completed was about 350.4 thousand pesos. To derive estimates of indirect costs we use the following approach. We assume that at time t_0 each unemployed worker faces two possible strategies: (i) to immediately initiate job search (control group); or (ii) to enter a training course and thus delay job search by the length of the course (trainees). We know, from our previous analysis, that the expected duration of search for trainees conditional on having attended the course (ie. once the course is over) is shorter than the expected duration of search for controls (by about 2.5 months). However, we also have to take into account the deferral of job search by trainees to participate in the program. We thus calculate the time to job for trainees by adding to search time the cost of delaying search by attending the training course (on average equal to 2.9 months). The cost of the training period is thus valued in terms of search time foregone. The benefit measures are calculated from the previous estimates of training effects on monthly earnings. Monthly earnings are predicted for trainees and controls using sample means of all regressors.

Table 14 summarizes the calculation of these cost and benefit measures for different groups of male trainees and controls. The first two columns show the mean duration of search for trainees (4 months) and controls (6.5 months), separately for those with and without prior work experience, and for younger (age 25 or less) and older (over 25 years) individuals. The difference between (2) and (1) measures the gain in search time (employment effect) attributable to the program. Column (3) adds the average duration of training (2.9 months) to the search time for trainees. Column (4) reports the difference between columns (3) and (2).

For male trainees as a whole, column (4) shows that PROBECAT participation increases total time-to-first job (search + training time) by 0.4 months relative to the control group (6.9 - 6.5 months). For male trainees aged 25 years and over, program participation actually reduces their time-to-first-job by 0.8 months, even after including the added time spent in training; for those with prior work experience, the delay in search from training is completely offset by a shorter search after training. Column (6) shows the predicted monthly wages for trainees and controls evaluated at sample means. The difference between predicted wages for trainees and controls can be interpreted as the earnings effect from training. These earnings effects are large for all groups, averaging about 152 thousand pesos.

For female trainees overall, column (4) shows that training increases total time-to-first-job by about 1 month relative to the controls. However, this figure hides substantial differences by demographic group. For females with prior work experience, program participation reduces their time-to-first job by 1.1 months (even when delayed search due to training is included); for those aged 25 and over, training reduces total time to job by about 0.8 months. Column (6) shows predicted monthly wages at sample means for the female trainee and control groups. Although predicted trainee wages are slightly higher than control wages for all demographic groups, these differences are not statistically significant.

The net benefits of training are shown in Table 15. Column (1) shows the direct average per trainee cost of training--350.4 thousand pesos.[22/] The second column is the indirect cost of training, namely, the monetized value of incremental search costs (foregone earnings) associated with training, valued at the average wage of the comparable control group (i.e. the wage trainees would have received had they not participated in PROBECAT). These indirect costs average about 196 thousand pesos for males and 435 thousand pesos for females, but vary by demographic group. They range from 2,088 thousand pesos for females without prior work experience to minus 514 thousand pesos for those with prior work experience, and to minus 575 thousand pesos for male trainees over 25 years. The final two columns summarize the benefits of training associated with increased wages over three months and over twelve months, respectively.

The main conclusion that emerges from Table 15 is that for some groups of male trainees (those with prior work experience and those over 25), the

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22/ The training stipend is not taken into account as it is simply an income transfer and not an economic cost.

benefits of program participation outweigh the costs within 3 months of starting employment. For all other males except those with no prior work experience, the benefits outweigh the costs within one year. Males with no prior work experience, on the other hand, spend the longest time in job search after training (8 months as compared to the trainee mean of 4.4 months) and benefit relatively less from training in terms of monthly earnings (128 thousand pesos as compared to the average benefit of 152 thousand pesos). For this group, the costs of training are offset only after 17 months of higher earnings upon finding employment. For women, we find that program benefits from earlier employment offset the costs for those with prior work experience and for those over 25 years. Although we do not find significant wage effects, for these women the program pays for itself. For other women, the costs exceed the benefits.

In short, the PROBECAT retraining program appears to be cost-effective for improving the economic conditions of most groups of unemployed males, except for those with no prior work experience. It also appears to be cost-effective in reducing search time for certain groups of unemployed females, namely older, more experienced female workers.

Policy Implications

This evaluation suggests that the unemployed constitute a heterogenous group and that eligibility criteria for program participation are important determinants of the cost-effectiveness of the program. In the specific case of Mexico, the analysis suggests that the selection criteria should be modified to target those demographic groups likely to benefit most from the program, namely unemployed workers with prior work experience, slightly older workers (aged over 25), and those with 6 to 12 years of schooling. For certain groups--the very young, new entrants into the labor force, and those with low levels of schooling attainment--it may be more important to provide other kinds of training, introduce apprenticeship programs to give new entrants some work experience, or facilitate return to school.[23/]

More broadly, our study demonstrates that the results can be very sensitive to the way in which training effects are measured. We identified two principal sources of bias that many manpower training evaluations are likely to encounter: biases arising from (a) sample selectivity and (b) from

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23/ Some of these conclusions have already been incorporated into the design of the new PROBECAT program under the Mexico Labor Market and Productivity Enhancement Project (1992).

non-representativeness of the treatment group. Addressing these biases is essential in any program impact evaluation.

Our results strongly suggest that a wide variety of potential program impacts be investigated. Training programs may have an impact on some labor market outcomes but not others. Focusing on one outcome versus others may make the difference between continuation or termination of the program. A broad approach is also potentially more revealing about the direct and indirect ways in which training programs affect target populations.

Although the Mexican retraining program has proven to be effective, several issues need to be considered before such programs are replicated on a large scale in other countries:

(1) As the impact of the program depends on the characteristics of the unemployed, it appears essential to analyze the structure and characteristics of unemployment prior to implementing any training program.

(2) Results and cost-effectiveness of the program also appear to be sensitive to other factors such as the length of the program, and the overall state of the labor market. In the case of Mexico, the program may have been helped by the fact that unemployment remained moderate and employment fairly stable during the program implementation period.

(3) For the above reasons, implementation of these types of training programs should be gradual, and accompanied by a strong monitoring and evaluation system.

Finally, it is worth noting that this evaluation still has several important limitations. One, our control sample is quite small. Two, our unemployment duration data for controls had to be imputed by reconstructing complete spells from observations on the same individuals in successive quarters. Three, some important dimensions of PROBECAT--training duration, type of training, mix of theory and practice, and different training providers--were not studied. Future evaluations should attempt to address these shortcomings. In particular, they should investigate the differential impacts of alternative training modalities, and evaluate their relative cost-effectiveness. It could also be of interest to track PROBECAT trainees over longer periods of time to measure the long-term effects of the program.

Table 1

DISTRIBUTION OF UNEMPLOYED BY AGE 1988			
	Men		Women
Age	Standard Definition	Alternative Definition	Standard Definition
12-15	4.2	10.7	2.5
16-20	33.3	33.5	36.6
21-25	24.7	19.3	38.1
26-30	13.3	10.5	
31-40	8.8	9.0	11.7
41-50	8.0	9.5	6.9
51-60	5.1	5.9	2.5
61-70	2.6	1.6	1.7

DISTRIBUTION OF UNEMPLOYED BY EDUCATION LEVEL, 1988			
	Men		Women
Years of school	Standard Definition	Alternative Definition	Standard Definition
0	2.4	4.4	1.6
1-5 years	9.7	12.5	8.6
6	16.0	20.0	14.6
7-8	12.9	12.8	8.6
9	20.4	18.8	18.9
10-12	20.2	18.1	35.6
13 and more	18.4	13.4	12.1

Table 2

Demographic Characteristics of Trainees and the Unemployed

	Males		Females	
	Trainees	ENEU	Trainees	ENEU
Age	27.9	25.8	29.0	24.3
% Married	41.2	27.2	45.7	27.2
% Unmarried Couple	3.8	2.6	3.3	4.1
Education:				
Average Yrs School	9.1	8.8	7.8	9.8
Highest level reached:				
No formal	0.1	1.7	0.4	1.5
Primary incomp.	3.4	12.7	9.1	7.7
Primary	13.2	21.5	18.1	16.9
Secondary incomp.	17.5	9.6	24.5	11.8
Secondary complete	30.5	24.1	29.7	16.4
Higher secondary	26.6	13.6	13.8	28.7
University	8.6	13.2	4.3	15.9
% Head of household	42.8	29.4	11.6	5.1

Note: Controls are unemployed individuals in ENEU 3/90.

Table 3				
Cox Proportional Hazards Model:				
Male Sample				
Independent Variables	(1)	(2)	(3)	(4)
Age	-.009 (-1.595)	-0.007 (-1.297)	-.008 (-1.551)	-.007 (-1.261)
Sch	-.016 (-1.370)		-.016 (-1.401)	
Ned		.110 (0.284)		.106 (0.272)
Priminc		-.168 (-0.903)		-.169 (-0.908)
Secinc		-.015 (-0.116)		-.018 (-0.142)
Secc		-.139 (-1.200)		-.137 (-1.184)
Sech		-.031 (-0.262)		-.037 (-0.309)
Coll		-.296 (-1.940)		-.299 (-1.961)
Hhead	.318 (3.233)	.311 (3.154)	.315 (3.203)	.309 (3.135)
Nohijos	-.011 (-0.349)	-.008 (-0.269)	-.012 (-0.394)	-.010 (-0.307)
Wkexp0	.737 (5.593)	.742 (5.612)	.777 (5.565)	.775 (5.538)
Trainee	.355 (4.101)	.340 (3.840)		
Trainee1			.395 (4.034)	.373 (3.739)
Trainee2			.321 (3.380)	.312 (3.215)

Independent Variables

- age
- sch=yrs of school
  ned=1 if no formal education (=0 otherwise)
  priminc=1 if incomplete primary
  secinc=1 if incomplete secondary
  secc=1 if complete secondary
  sech=1 if higher secondary
  coll=1 if college
- hhead=1 if household head (=0 otherwise)
- nohijos=number of children
- wkexp0=1 if prior work experience
- trainee=1 if program participant
- trainee1=1 if program participant & unemployed <= 6 months
- trainee2=1 if program participant & unemployed > 6 months

Table 4				
Cox Proportional Hazards Model:				
Female Sample				
Independent Variables	(1)	(2)	(3)	(4)
Age	-.014 (-1.866)	-.014 (-1.867)	-.011 (-1.467)	-.011 (-1.481)
Sch	.005 (0.300)		.004 (0.240)	
Ned		.949 (1.305)		.876 (1.208)
Priminc		.042 (0.212)		.024 (0.119)
Secinc		-.017 (-0.115)		-.041 (-0.276)
Secc		-.074 (-0.490)		-.109 (-0.727)
Sech		.125 (0.787)		.123 (0.769)
Coll		.043 (0.187)		-.0002 (-0.001)
Hhead	.399 (2.970)	.390 (2.881)	.457 (3.427)	.449 (3.343)
Nohijos	-.002 (-0.056)	-.007 (-0.203)	.006 (0.160)	-.0002 (-0.007)
Wkexp0	.507 (4.731)	.506 (4.713)		
Trainee	.012 (0.098)	.071 (0.543)		
Trainee1			.236 (1.631)	.314 (2.078)
Trainee2			-.153 (-1.175)	-.083 (-0.608)

Independent variables

- age
- sch=yrs of school
  ned=1 if no formal education (=0 otherwise)
  priminc=1 if incomplete primary
  secinc=1 if incomplete secondary
  secc=1 if complete secondary
  sech=1 if higher secondary
  coll=1 if college
- hhead=1 if household head (=0 otherwise)
- nohijos=number of children
- wkexp0=1 if prior work experience
- trainee=1 if program participant
- trainee1=1 if program participant & unemployed <= 6 months
- trainee2=1 if program participant & unemployed > 6 months

Table 5

Employment Outcomes for Trainees versus Comparison Group (ENEU)

Alternative Definition of Unemployed*

	Males		Females	
	Trainees	Controls	Trainees	Controls
% EMPLOYED				
3 months after	60.0	51.0	33.0	29.0
6 months after	65.0	56.0	38.0	32.0
9 months after	66.0	61.0	38.0	34.0
12 months after	71.0	65.0	39.0	35.0
DIFFERENCE BETWEEN CHANGES FOR TRAINEES AND FOR COMPARISON GROUP				
after 3 months	9.0		4.0	
after 6 months	9.0		6.0	
after 9 months	5.0		4.0	
after 12 months	6.0		4.0	

Note: * Unemployed defined as those who are not working, not studying, not retired (under 55), able to work (not sick or disabled), regardless of whether actively searching for job or not. Women who report being at home taking care of the house are NOT counted as unemployed.

Table 6

Employment Outcomes for trainees versus Comparison Group (ENEU) - Males

	Trainees		Control Group -- ENEU 3/90	
	w/ Wk Exp	no Wk Exp	w/ Wk Exp	no Wk Exp
% EMPLOYED				
3 months after	65.0	32.2	60.0	34.6
6 months after	70.6	35.7	69.8	33.1
9 months after	71.2	37.4	73.2	40.4
12 months after	76.4	40.9	74.5	49.3
DIFFERENCE BETWEEN CHANGES FOR TRAINEES AND FOR COMPARISON GROUP				
after 3 months	5.0	-2.4		
after 6 months	0.8	2.6		
after 9 months	-2.0	-3.0		
after 12 months	1.9	-8.4		

Note: * Unemployed defined as those who are not working, not studying, not retired (under 65), able to work (not sick or disabled), regardless of whether actively searching for job or not.

Employment Outcomes for trainees versus Comparison Group (ENEU) - Females

	Trainees		Control Group -- ENEU 3/90	
	w/ Wk Exp	no Wk Exp	w/ Wk Exp	no Wk Exp
% EMPLOYED				
3 months after	43.3	15.1	32.4	23.8
6 months after	50.0	17.4	35.2	28.6
9 months after	50.0	19.0	33.3	34.5
12 months after	50.2	21.6	34.3	36.9
DIFFERENCE BETWEEN CHANGES FOR TRAINEES AND FOR COMPARISON GROUP				
after 3 months	10.9	-8.7		
after 6 months	14.8	-11.2		
after 9 months	16.7	-16.5		
after 12 months	15.9	-15.3		

Note: * Unemployed defined as those who are not working, not studying, not retired (under 65), not taking care of the home, and able to work (not sick or disabled), regardless of whether actively searching for job or not (ie. it includes "discouraged workers" who respond they are not searching because they don't expect to find a job)

Table 7
Estimated Training Effect on Employment[a] -- Males

Trainees vs. Controls

	Difference in Predicted Emp. Probabilities (spec. with Educ Dummies)		Difference in Predicted Emp. Probabilities (sec. with continous school variable)	
	Uncorrected (1)	Sel. Correction[b] (2)	Uncorrected (1)	Sel. Correction[b] (2)
FROM UNWEIGHTED PROBITS:				
After 3 months	.055*	.084**	.072**	.098**
After 6 months	0	.055**	0	.077**
After 12 months	0	0	0	0
FROM WEIGHTED PROBITS[c]:				
After 3 months	.115*	.097**	.113**	.095**
After 6 months	0	.095**	0	.10**
After 12 months	0	.058 *	0	0

[a] Difference between predicted employment probabilities due to training dummy. Estimated from probit equations shown in Tables ---. Column (1) is based on uncorrected probits. Column (2) is based on probits with selectivity correction.

[b] Controls selected according to selection criteria used for trainees.

[c] Sample weights are constructed to match proportion of trainees in total population of unemployed age 15-54 (1988).

* Near-Significant (.10)
** Significant (.05)

Table 8

Estimated Training Effect on Employment[a] -- Females

Trainees vs. Controls

	Difference in Predicted Emp. Probabilities (spec. with Educ Dummies)		Difference in Predicted Emp. Probabilities (spec. with continous school variable)	
	Uncorrected (1)	Sel. Correction[b] (2)	Uncorrected (1)	Sel. Correction[b] (2)
FROM UNWEIGHTED PROBITS:				
After 3 months	0	.083**	0	0
After 6 months	.07*	.137**	0	.07*
After 12 months	0	.113**	0	0
FROM WEIGHTED PROBITS[c]:				
After 3 months	0	.051 *	.069**	.067 *
After 6 months	.09**	.106**	.079**	.087**
After 12 months	.096**	.092 *	.090**	.090**

[a] Difference between predicted employment probabilities due to training dummy. Estimated from probit equations shown in Tables ---. Column (1) is based on uncorrected probits. Column (2) is based on probits with selectivity correction.

[b] Controls selected according to selection criteria used for trainees.

[c] Sample weights are constructed to match proportion of trainees in total population of unemployed age 15-54 (1988).

* Near-Significant (.10)
** Significant (.05)

Table 9

Estimated Effect of Training on Employment--Females II
Experienced Workers vs. New Entrants

	No Work Exp.	With Work Exp.
WEIGHTED PROBITS		
3 months	-.127**	.149**
6 months	-.083	.209**
12 months	-.103**	.198**

Table 10
Monthly Salary, Hours Worked, and Hourly Wage
for Trainees and Controls

Sample	Outcome variables	Trainees	Controls
A. Male Samples (number of observations)		1212	1051
	Monthy salary (1,000 pesos)	681.59	637.67
	Weekly hours worked	45.81	43.59
	Hourly wage (1,000 pesos)	3.984	4.016
B. Female Samples (number of observations)		681	300
	Monthy salary (1,000 pesos)	531.85	571.52
	Weekly hours worked	42.77	39.51
	Hourly wage (1,000 pesos)	3.476	4.198

Table 11
The Effects of Participation in PROBECAT -- Men and Women

Model Specification	(1) Simple OLS without corrections coef.	t-stat	(2) Corrected for training selection coef.	t-stat
		MALE SAMPLES		
A. Logarithm of Monthly Salary				
Unweighted	-.108	-3.26	.177	2.19
Weighted	-.081	-1.49	.269	1.54
B. Hours of Work Per Week				
Unweighted	.978	1.32	7.796	4.32
Weighted	1.260	1.12	8.408	2.30
C. Logarithm of Hourly Wage				
Unweighted	-.095	-2.61	-.007	-0.07
Weighted	-.076	-1.34	.049	0.26
		FEMALE SAMPLES		
A. Logarithm of Monthly Salary				
Unweighted	-.122	-2.42	.033	0.25
Weighted	-.124	-1.40	.021	0.08
B. Hours of Work Per Week				
Unweighted	4.484	4.19	6.234	2.06
Weighted	4.268	2.43	1.185	0.23
C. Logarithm of Hourly Wage				
Unweighted	-.261	-4.48	-.105	-0.68
Weighted	-.250	-2.50	.180	0.61

Source: see tables 3.1 to 3.14 in Annex 1.

Table 12

Effects of PROBECAT Training for MEN
Corrected for Sample Selection - Unweighted & Choice-based Weights

Explanatory Variables	OLS Estimates			Weighted Least Squares Estimates		
	Log Monthly Salary	Weekly Hours Worked	Log Hourly Wage	Log Monthly Salary	Weekly Hours Worked	Log Hourly Wage
Constant	5.726 **	42.587 **	.574 **	5.711 **	43.561 **	.541 **
General experience	.023 **	.134	.019 **	.027 **	.163 **	.021 **
Experience-squared	-.000 **	-.004 **	-.000 **	-.000 **	-.003 **	-.000 **
Schooling attainment						
No Education	-.203 **	-1.024	-.194	-.279 **	-2.055	-.239 **
Primary-incomp.	-.005	-.797	.003	-.041	-1.298	-.018
Secondary-incomp.	.062	.430	.026	.084 *	.802	.035
Secondary-comp.	.165 **	-1.790	.186 **	.194 **	-1.328 *	.200 **
High school	.279 **	-.704	.295 **	.324 **	.096	.316 **
College	.571 **	-.455	.555 **	.644 **	1.042	.581 **
Training x Schooling						
No Education	-.058	14.820	-.485	.055	18.035	-.472
Primary-incomp.	-.063	9.101 **	-.270 **	.031	11.755 **	-.261
Primary-comp.	.212 **	8.409 **	-.002	.311	11.306 **	.002
Secondary-incomp.	.267 **	5.424 **	.161	.366 **	8.052 **	.175
Secondary-comp.	.199 **	10.132 **	-.039	.319 *	13.112 **	-.019
High School	.171 *	7.848 **	-.029	.277	10.502 **	-.013
College	.045	2.769	.032	.138	4.805	.053
Lamda (sel. corr'd)	-.179 **	-4.650 **	-.049	-.197 **	-5.216 **	-.044
R-squared	.157	.054	.145	.206	.060	.191
Sample size	2330	2271	2271	2330	2271	2271

Notes: 1. Regressions included duration of previous unemployment, self employed status, and time dummy variables.
2. * and ** denotes statistical significance at the 5 percent and 1 percent levels, respectively.

Table 13
Probability of POST-PROBECAT Employment
in a Larger Firm (Men)

Dependent Variable: Firm Size Categories 1-10			
Explanatory Variables	Maximum Likelihood Ordered Logit Estimates		
	(1)	(2)	(3)
Schooling Attainment			
No education	-.262	-.163	-.229
Primary-incomp.	-.014	.102	-.051
Secondary-incomp.	.289 **	.236 *	-.092
Secondary-compl.	.202 *	.189	.095
High School	.517 **	.633 **	.541 **
College	.482 **	.986 **	.845 **
PROBECAT Trainee			
Trainee (1,0)	.786 **		
x Schooling		.246 **	
x Schooling-squared		-.017 **	
x No education			-.236
x Primary-incomp.			.827 **
x Primary-comp.			.707 **
x Secondary-incomp.			1.314 **
x Secondary-comp.			.893 **
x High School			.688 **
x College			-.057
Lamda (sel. coor'd)	-.354 **	-.282 **	-.338 **

NOTES: 1. Sample of 2330 observations. Regressions included quadratic specification of general experience, the duration of previous unemployment, and time dummy variables.
2. * and ** denotes statistical significance at the 5 percent and 1 percent levels, respectively.

Table 14
Evaluation of Labor Retraining Program

Summary of Program Effects

Trainee Type	Average Duration of Search (months)		Trainees:Time to Job = Search + Trg Period[2] (3)	Time to Job Trainees - Controls (4)	Wage Effect[3] $LnW_t - LnW_c$ (5)	Predicted Monthly Wage[4] ('000s) (6)	
	Trainees (1)	Controls (2)				Trainees	Controls
Males							
All	4.0	6.5	6.9	0.4	.27*	642	490
With Prior Wk Exp.	3.5	6.5	6.4	-0.1	.35**	665	507
No Prior Wk Exp	7.2	5.9	10.1	4.2	.27*	541	413
Age <=25	4.7	6.1	7.6	1.5	.37**	609	421
Age > 25	3.2	6.9	6.1	-0.8	.22*	719	577
Meeting Education Selection Criteria[1]	3.9	6.1	6.8	0.7	.28 to .37*	632	460
Females							
All	5.9	7.8	8.8	1.0	.02	444	435
With Prior Wk Exp.	5.0	9.0	7.9	-1.1	.11	467	457
No Prior Wk Exp	8.2	5.8	11.1	5.3	.02	402	394
Age <=25	6.0	7.0	8.9	1.9	.16	475	404
Age > 25	5.7	9.4	8.6	-0.8	.04	454	436
Meeting Education Selection Criteria[1]	5.9	7.8	8.8	1.0	-.13 to .10	435	422

* Significant at 10% level
** Significant at 5% level

[1] Individuals with at least complete primary education but no more than complete higher secondary.
[2] Average duration of training period = 2.9 months.
[3] Equals the coefficient on a dummy for trainee status from regression of log monthly wages on experience, experience squared and schooling. The regression also includes quarter dummies, a dummy for self-employment, duration of unemployment prior to time t0, a dummy for prior work experience, and interactions between the training dummy and schooling status, and between the training dummy and age (see main text and tables 10 and 11 for detailed description of results).
[4] Predicted monthly wages at sample means from same regression.

Table 15

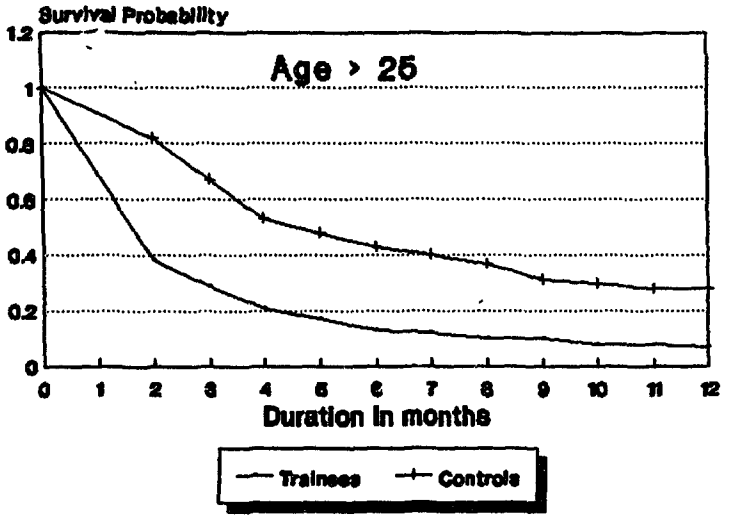
Net Benefits By Type of Trainee

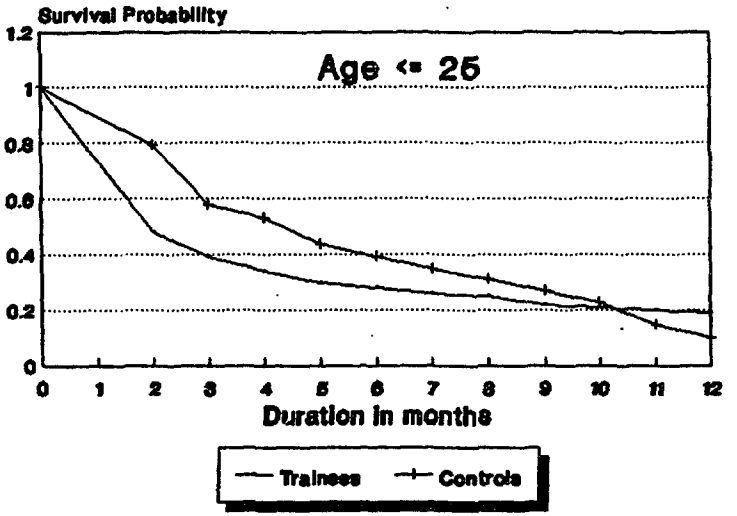
Trainee Type	Costs of Training		Benefits: Increase in Monthly Wage ('000s)	
	Direct Trg Costs ('000s) (1)	Search Costs [1] ('000s) (2)	Over 3 months (3)	Over 12 months (4)
Males				
All	350.4	196.0	456.0	1,824.0
With Prior Wk Exp.	350.4	-66.5 [2]	474.0	1,896.0
No Prior Wk Exp	350.4	1,734.6	384.0	1,536.0
Age <=25	350.4	631.5	564.0	2,256.0
Age > 25	350.4	-575.2[2]	426.0	1,704.0
Meeting Education Selection Criteria[1]	350.4	322.0	516.0	2,064.0
Females				
All	350.4	435.0	0	0
With Prior Wk Exp.	350.4	-513.7[2]	0	0
No Prior Wk Exp	350.4	2,088.2	0	0
Age <=25	350.4	767.6	0	0
Age > 25	350.4	-348.8[2]	0	0
Meeting Education Selection Criteria1	350.4	422.0	0	0

[1] Equals the additional time trainees take to find a job (because of time in training) times the oportunity cost of that time (which equals the wage of the controls –ie. the wage the trainees would have received without the training).

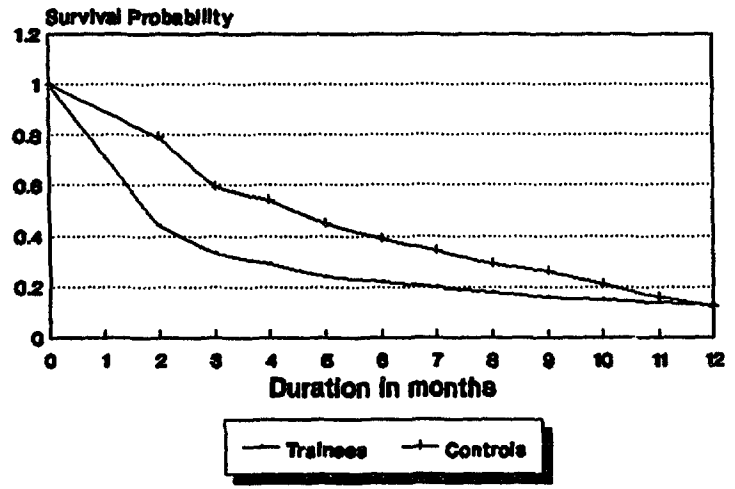
[2] Trainees with work experience and those aged 25 and over find a job sooner than controls even when you take into account the training period. This estimate equals the extra time worked by trainees relative to controls * trainee wage.

Figure 1: Survival Curves for Unemployed Males

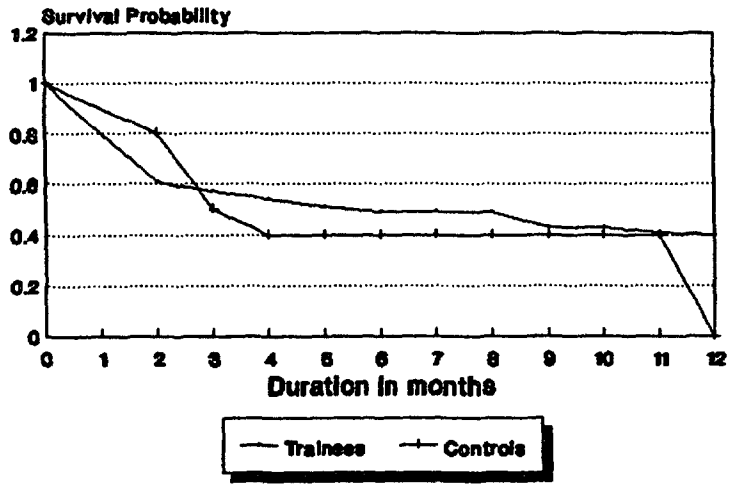




Age <= 25
With Prior Work Experience

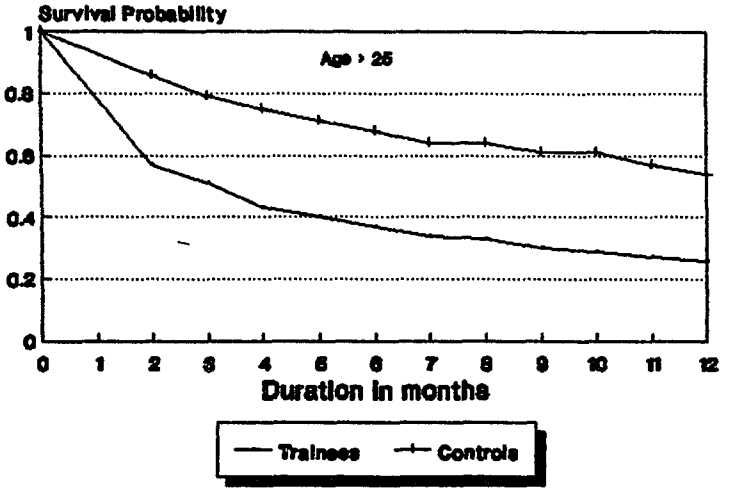


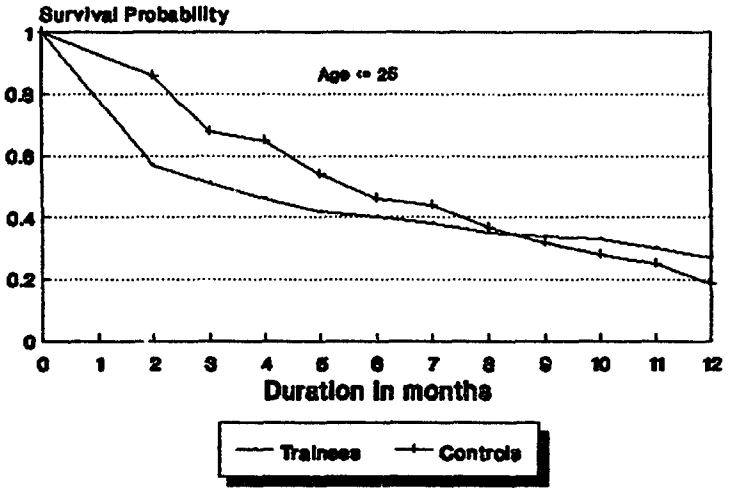
Age <= 25
With No Prior Work Experience

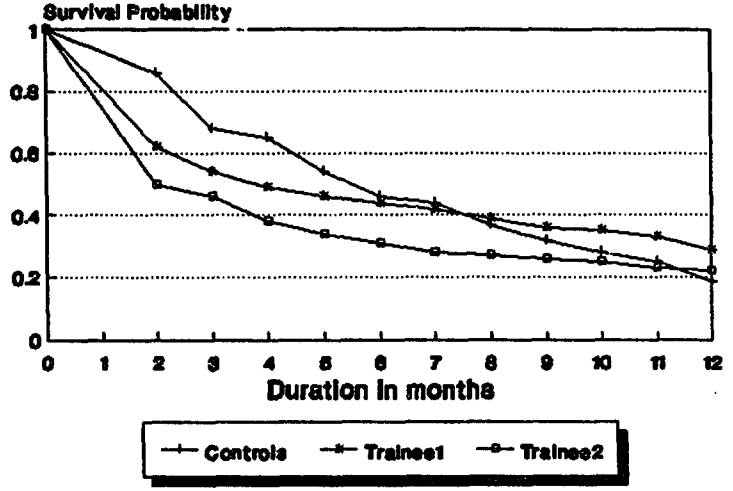


Note: control sample very small

Figure 2: Survival Curves for Unemployed Females







Trainee1=1 if trainee & unemployed <= 6 months

Trainee2=1 if trainee & unemployed > 6 months

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